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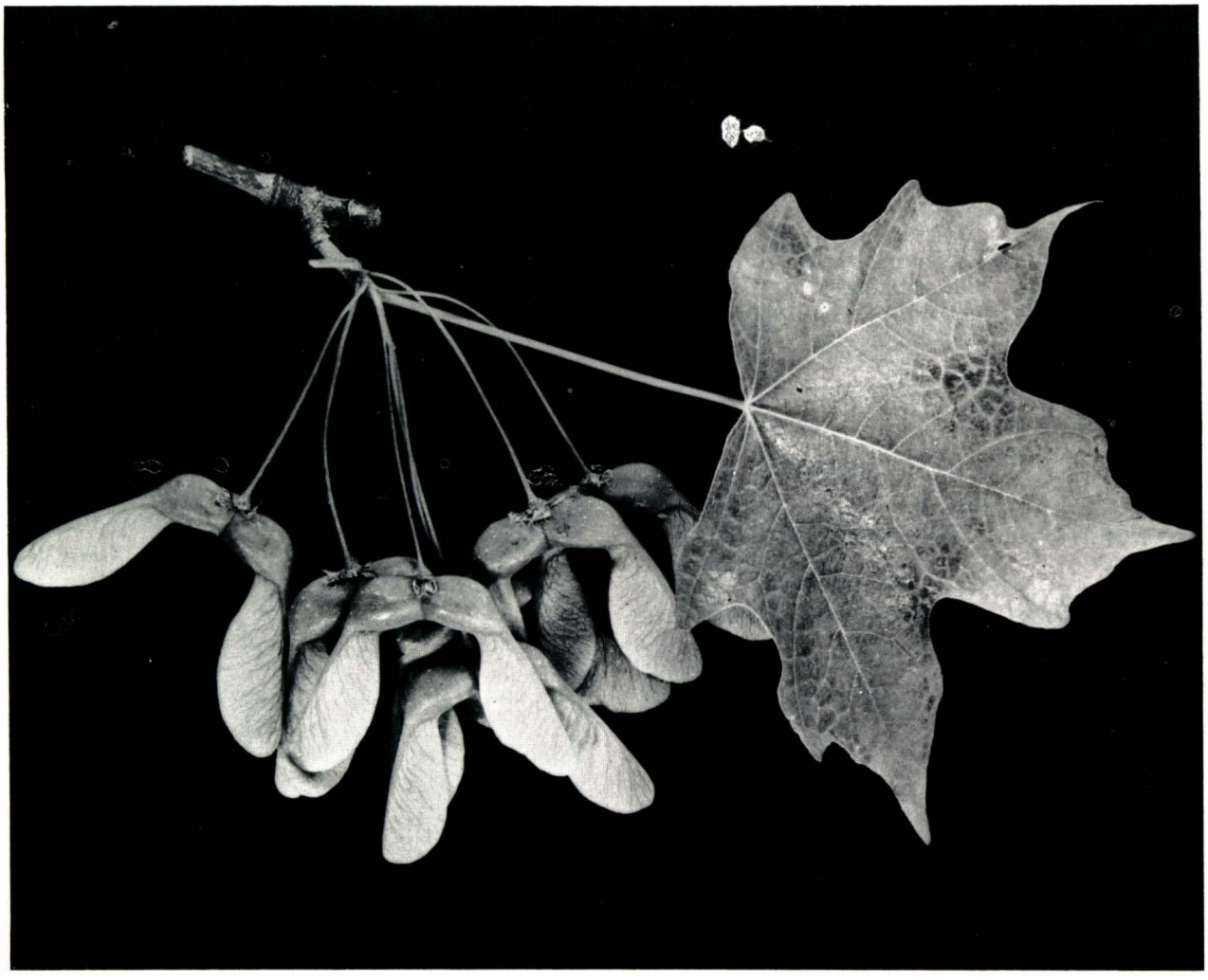
# *ACER*
## (maples)

About 115 species of maples (*Acer*) are distributed through the north temperate zone and south in tropical mountains to Guatemala, in northern Africa, and in Java across the Equator. Five of the 13 or fewer species native in the United States are important timber trees.

Maples are deciduous (rarely evergreen) trees, or sometimes shrubs. They have opposite long-petioled leaves, mostly simple, usually palmately lobed and palmately veined and with toothed margins. In a few species, such as boxelder, the leaves are pinnate with 3 to 7 leaflets. The winter buds have overlapping scales or 2 outer scales.

The small 5-parted flowers are borne in early spring before the leaves, or in summer, in lateral or terminal clusters, usually branched. They are commonly unisexual (monoecious, dioecious, or polygamo-dioecious), or bisexual. The fruit, maturing in spring, or fall, splits into 2 long-winged, flat, 1-seeded keys (samaras).



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# BIGLEAF MAPLE (*Acer macrophyllum* Pursh)

Other common names: Oregon maple, broadleaf maple.

Bigleaf maple is the only commercially important maple in the Pacific coast region. Its range extends from the mountains of southern California, northward through the western parts of Oregon, Washington, and British Columbia almost to the southern tip of Alaska. Best development of bigleaf maple is on alluvial soils in western Oregon and western Washington where it occasionally forms practically pure, dense stands over limited areas.

## HABITAT CONDITIONS

### Climate

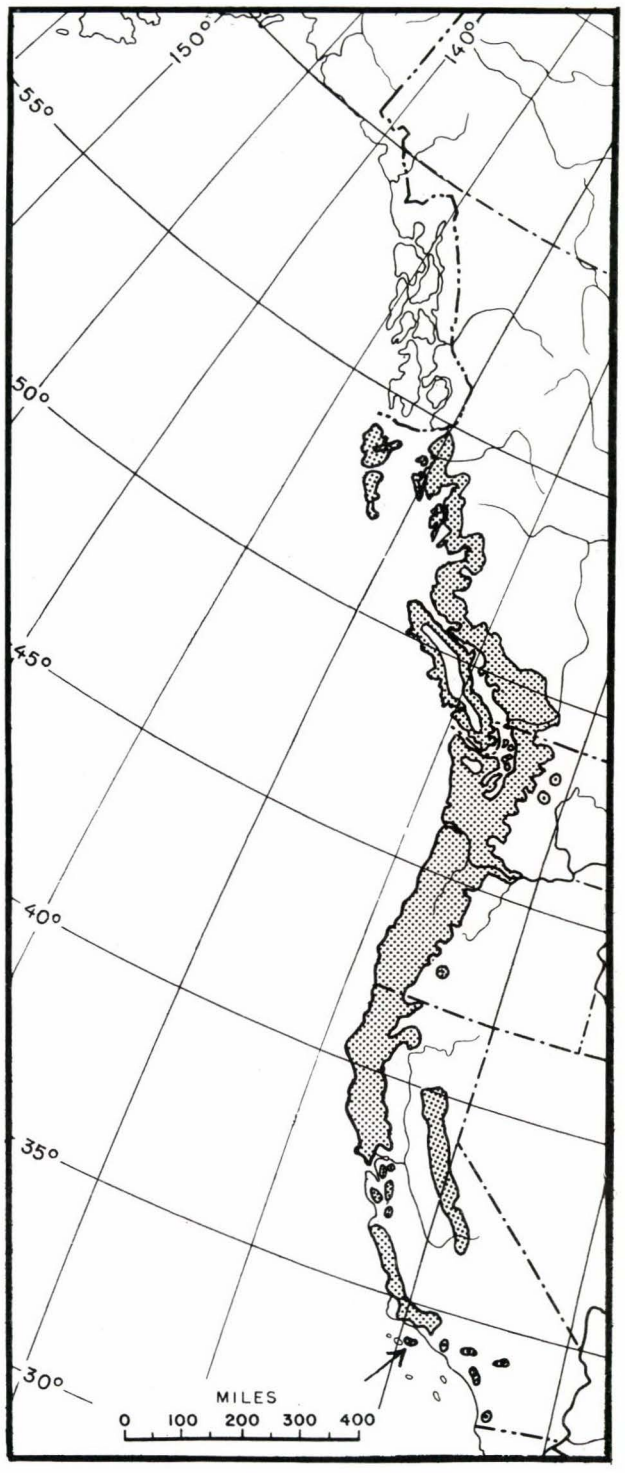
Optimum growing conditions for bigleaf maple are found in the humid and superhumid climates of western Oregon, where the mean annual temperature is above 50° F. with little seasonal variation. This climate is characterized by relatively cool summers, long frost-free seasons, and abundant precipitation, especially during the winters. The southermost fringe of bigleaf maple lies in the moist subhumid climatic type with summer moisture deficiency. The northern edge of bigleaf maple habitat lies in the subhumid type, with adequate moisture during all seasons. Probably the factor most limiting the southern extension of this species is moisture insufficiency. The northern extension is probably limited by temperature.

### Soils and Topography

Bigleaf maple is found on a variety of soils, from deep loams to thin soils on rocky slopes. The best stands grow on deep alluvial soils near streams. An affinity of bigleaf maple for permanent watercourses is most conspicuous in the southern part of its range where it is usually limited to banks of rivers and streams and to moist swales on north and east slopes. In the coast range near the San Francisco Bay area, for example, bigleaf maple is restricted almost entirely to banks of permanent streams (*3*, *7*).[1]

In British Columbia, bigleaf maple is sometimes found as pioneer growth on hillsides laid bare by slides or fire (*12*). In the Oregon coast range and on the western slopes of the Cascades, it frequently invades logged and burned areas, particularly in moist locations.

In coastal British Columbia, bigleaf maple rarely occurs at elevations above 1,000 feet. Southward, upper elevational limits gradually

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The range of bigleaf maple.

[1] Italic numbers in parentheses refer to Literature Cited, p. 53.

increase to 1,500 feet on the Olympic Peninsula; 3,400 feet in the central part of the coast range in California; 5,500 feet on the west slope of the Sierra Nevada; and a maximum of 7,000 feet in the coastal mountains of Southern California and on the north slopes of the San Gabriel Mountains. Lower limits range from sea level in the north to 3,000 feet in the south (*1, 3, 4, 6, 8, 10, 12*).

### Associated Trees and Shrubs

Bigleaf maple is an associate species in the following forest cover types:

| *Type No.* | *Type* |
|---|---|
| 221 | Red Alder |
| 222 | Black Cottonwood—Willow |
| 233 | Oregon White Oak |
| 234 | Oak—Madrone |

Occasional pure stands of bigleaf maple are found in moist soils near streams, but as a rule the trees are scattered or in small groups with other species. Common associates in the northern part of its range are red alder, Douglas-fir, western redcedar, grand fir, western hemlock, black cottonwood, Oregon white oak, vine maple, Pacific yew, and Oregon ash. In the southern part of its range, common associates include California-laurel, redwood, willows, Pacific madrone, white alder, California live oak, and California sycamore.

## LIFE HISTORY

### Reproduction and Early Growth

*Flowering and fruiting.*—Bigleaf maple first produces flowers at about 10 years of age, with open-grown specimens producing more abundantly and earlier in life than trees in dense stands. Mature, open-grown trees often bear extraordinary crops of seed year after year (*4*). Even in dense stands, full-crowned trees produce light seed crops every year (*11*). Flowers—in yellow, scented racemes—develop from the same buds as the leaves and grow rapidly to maximum size. Leaves are inconspicuous at first, only the flowers being noted by the casual observer. Over the central part of its range in Oregon and Washington, the buds of bigleaf maple usually burst in early April. At high elevations, however, flower growth may be delayed until May. Insects are attracted to the blossoms in great numbers and are responsible for pollination (*4*), which usually occurs within 2 to 4 weeks after bud bursting in the spring.

The fruit, a double or occasionally triple samara, is green at first, later turning to brown as it ripens. It appears as conspicuous elongated clusters on the trees.

*Seed production and dissemination.*—The seed reaches maturity from late August to October and is dispersed by wind in the late fall and early winter. Occasionally seed persist on the tree all winter. There are approximately 3,100 bigleaf maple seed per pound. This species is the only known maple whose seed cannot be successfully stored for even short periods of time at either room or low temperatures. The seed are eaten by mice, woodrats, squirrels, chipmunks, and some birds.

*Seedling development.*—Natural regeneration of bigleaf maple is usually adequate, and in mixed stands this tree will sometimes encroach on land formerly dominated by other species. Bigleaf maple is a more prolific and consistent seed producer than Douglas-fir. Its initial height growth is also greater, which gives it an added advantage. In some situations, bigleaf maple seedlings become established and survive for several years under fully stocked stands of Douglas-fir.[2] The maple seedlings in small openings develop faster as the light intensity in the openings increases (*9*).

*Vegetative reproduction.*—Bigleaf maple sprouts vigorously from the stump. There is little information available as to the effect of tree age or size on sprouting nor is there any information as to the rooting ability of cuttings.

### Sapling Stage to Maturity

Growth of bigleaf maple is rapid during the first 40 to 60 years. The tree varies greatly in size and form, from short-stemmed, crooked trees 25 to 30 feet tall at the extremities of its geographic range (*7*) to a giant tree in Lane County, Oreg., 8.9 feet in diameter with a crown spread of 66 feet (*5*). Over most of the range, mature trees average about 50 feet in height and 1.5 feet in diameter. The boles of open-grown trees fork into stout ascending branches and form broad, rounded crowns. In almost all habitats, bigleaf maple develops a shallow, wide-spreading root system.

Growth of bigleaf maple decreases late in life and maturity is reached between 150 to 300 years. Old trees are often defective, and large burls—used for high-quality furniture—sometimes develop along their boles and at their bases.

*Reaction to competition.*—Althought bigleaf maple is classed as tolerant, it is less tolerant than most maples, including vine maple, and than western hemlock, western redcedar, and Pacific yew (*11*). Tolerance seems to decrease with age. During early life, bigleaf maple can endure considerable shade, but top light is needed for best growth. Dense side shade results in narrow crowns and boles of 100 feet or more that are free of limbs for one-half to two-thirds their length (*2*). Even though this tree makes rapid

[2] Yoder, Ray A. Bigleaf maple as a forest management problem in western Oregon. 1956. (Office rpt. Copy on file Forest Expt. Sta., Oreg. State Col., Corvallis.)

early growth, it is often overtopped and eventually shaded out by competing conifers.

*Principal enemies.*—Bigleaf maple is subject to a wilt disease (*Verticillium* sp.) and the speckled tar spot caused by *Rhytisma punctatum*. Also, a disease of unknown cause has been observed in California that kills the leaves and twigs. Trees, particularly in the older age classes, are subject to heart rot by several different decay-causing fungi, usually *Fomes* spp. and *Polyporus* spp.

Individual trees and small groups of trees are attacked by a variety of insects, none of which cause extensive damage. The maple seed caterpillar (*Proteoteras aesculana*) works in the seed, completely mining them out. The twig borers attacking bigleaf maple are *Agrilus politus politus*, *Chrysobothris femorata*, and *Phymatodes vulneratus*. Defoliators include the ceanothus silk moth (*Platysamia euryalus*), the polyphemus moth (*Telea polyphemus*), and the spotted tussock moth (*Halisidota maculata*).

In the sapling stage, bigleaf maple is an important browse plant for black-tailed and mule deer and in some areas for elk. The leaves are rated as having fairly good to good palatability for cattle and horses, but only fair to poor palatability for sheep.

## RACES AND HYBRIDS

A proposed variety of bigleaf maple, fairly common in the vicinity of Longview, Wash., is known as Kimball maple (*Acer macrophyllum* var. *kimballi*) (*6*). Kimball maple is easily distinguished by the very deep indentations between the major lobes and by the lacerated leaf margins.

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*Revised from "Silvical Characteristics of Bigleaf Maple," by Robert H. Ruth and Gerhard F. Muerle. U.S. Forest Serv. Pacific Northwest Forest and Range Expt. Sta. Silvical Ser. 13, 10 pp. 1958.*

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